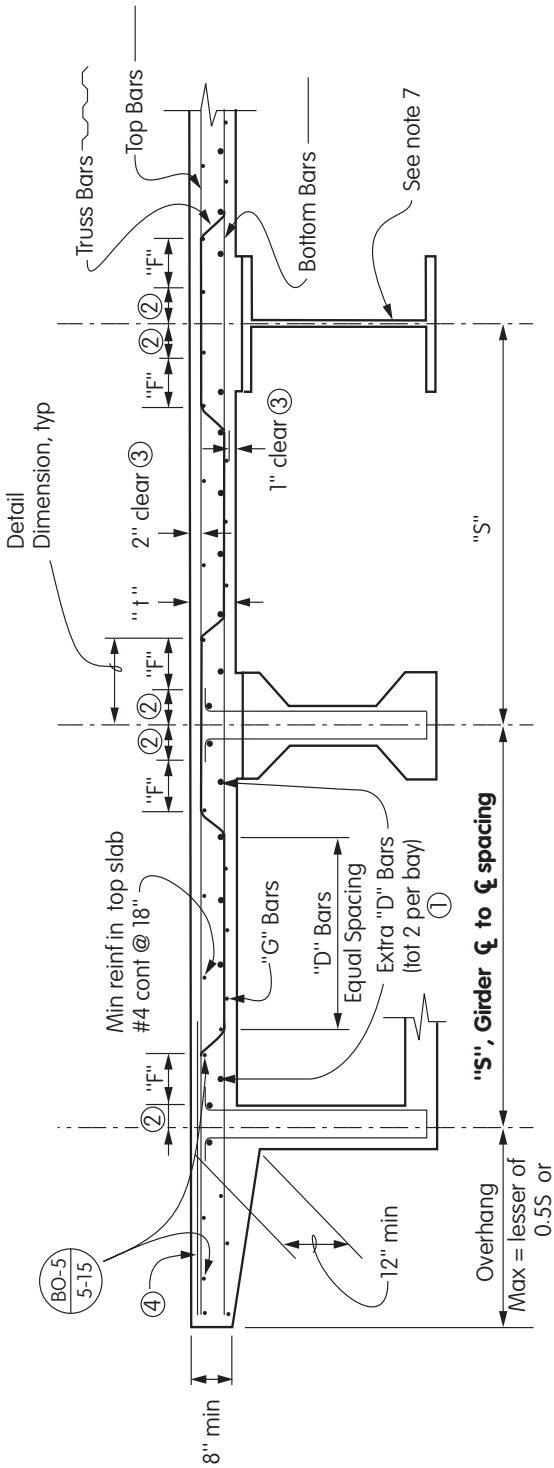
ATTACHMENT 1

Deck Slab Reinforcement Details

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS



MATERIAL PROPERTIES

f'_c = 3.6 ksi - Normal Weight Concrete
f_y = 60 ksi

LEGEND

① Extra " D" bars are to be added when span "S" ≥ 11'-6"
② Distance from ℄ girder to design section for negative moment (Art.4.6.2.1.6)
- Concrete box girders: 1/2 the girder web width
- Precast concrete I-shaped and T-shaped beams: 1/3 the flange width (15" max)
- Steel girders: 1/4 the flange width

③ Increase cover over bars and adjust slab thickness if required for environmental conditions. See Table 5.12.3-1 and MTD 8-2.
④ Provide additional top transverse deck reinforcement in the overhanges when "S" ≥ 11'-6". See note 10

Notes
For Notes, see page 4 of this Memo to Designers.
For deck slab thickness and reinforcement, see Table 10-20.1.

Deck Slab Design Information

Design Loads

M_{DC}: Moment due to deck self weight

M_{DW}: Moment due to 35 lb/ft^2 future wearing surface

M_{LL}: see Table A4-1

Distribution Reinforcement (Art. 9.7.3.2), see Note 11

$220 / \sqrt{S_{eff}} \leq 67\%$

S_{eff} = Effective span length

Load Cases

Strength I (Art. 5.7.3.2)

$M_u = 1.25\ M_{DC} + 1.5\ M_{DW} + 1.75 M_{LL}$

Resistance Factor, $\phi = 0.9$

Service I (Art. 5.7.3.4, crack control)

$M_s = M_{DC} + M_{DW} + M_{LL}$

Exposure Factor, $\gamma_e = 0.75$

Negative moment d_c based on 2 1/2" clear cover

Deck Overhang Design (Art. A13.4)

Design Loads

M_{DC}: Moment due to overhang & barrier self weight

M_{DW}: Moment due to 35 lb/ft^2 future wearing surface

M_{LL}: Moment due to Live Load plus Impact (Art. 3.6.1.3.3 & 4.6.2.1.3)

M_{CT}: Moment due to traffic railing design force F_t & F_v, see Table A13.2-1

Load Cases

Case 1: Extreme Event II

$M_u = 1.0M_{DC} + 1.0M_{DW} + 0.5M_{LL} + M_{CT}$

where, $M_{CT} = 1.2\ F_t H_b / L_c$, see note 9

Resistance Factor, $\phi = 1.0$

Case 2: Extreme Event II

$M_u = 1.0M_{DC} + 1.0M_{DW} + 0.5M_{LL} + M_{CT}$

where, $M_{CT} = F_v L_{OH} / L_v$,

Resistance Factor, $\phi = 1.0$

Case 3: Strength I

$M_u = 1.25\ M_{DC} + 1.5\ M_{DW} + 1.75\ M_{LL}$

Resistance Factor, $\phi = 0.9$

NOTES/LIMITATIONS

1. Article (Art.) and table numbers correspond to those in the AASHTO LRFD Bridge Design Specifications
2. Design is based on approximate method analysis - strip method (Art.4.6.2.1)
3. Slab is designed for strength, service and extreme event limit states (Art.9.5)
4. See Art. A4 for Live Load assumptions and limitations
5. Design details are applicable only for decks supported on at least three girders and having a width not less than 14 feet between centerlines of exterior girders
6. Overhang details are applicable for Type 25, 26, 732, and 736 barriers only
7. For steel girders, the transverse reinforcement shown for the exterior deck span should be verified for overhang demands
8. Overhang details are not designed for soundwall loading
9. $F_t H_b / L_c$ is the moment due to vehicular impact force (Art. A13.4.2)
10. Additional top transverse deck reinforcement shall be placed in the overhang for a distance of 5 ft on each side of an expansion joint in the barrier rail and at the ends of the barrier rail. This additional reinforcement shall consist of rebars that are of the same size as that of the transverse bars, and shall be bundled with each alternating top transverse bar in the overhang. This reinforcement shall extend for a minimum length of 25 bar diameters beyond the centerline of the exterior girder.
11. The positive moment region in the deck is assumed to be $0.5S_{eff}$ for determining the number of 'D' bars